Notes from May 5 QTG meeting to discuss simulation needs for ALD's charge

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QTG simulation needs for ALD's charge

Want to evaluate performance of various tracking options

Focus on Upsilon measurement

Use the same technique for each tracking configuration

Figures of merit

- Mass resolution
- Signal statistical precision
  - Depends on yield, background

Summary of the plan from the discussion

Generate signal mass spectrum, determine embedding corrections

Background: Using Hijing events:

A) Take all truth tracks projected to calorimeter, make cluster with fast sim

- Provides EMCal cluster list for use in matching

B) Make eID cuts on all **real** hadron tracks using either the list of clusters from A) or parameters extracted from G4 studies of real pions (preferably with track p_T & η dependence)

C) Make eID cuts on all **fake** tracks using the list of clusters from A). Note: can probably **not** factorize tracking and EMCal response for fake tracks

——– All tracks from B) and C) are random background tracks

Make all real (open HF) electron background tracks

Mix all background tracks to make overall background mass spectrum

Add normalized signal to normalized background => foreground mass spectrum

Extract signal precision by fitting

Repeat for all configurations of tracker and EMCal

Who does what?

Signal generation and embedding efficiency
  Tony & Marzia

Track matching to EMCal, HCal for real hadrons
   eID vs momentum for real hadrons misidentified - all EMCal configurations
  Kurt Hill, Jin, Gabor

Track matching to EMCal for fake tracks
   Fast sim provides calorimeter response for truth hadrons
   Matching to fake tracks - needs algorithm to match any track to clusters from fast sim
   Kurt?

Single electron efficiency for no tower ganging and 2x2 tower ganging in EMCal
   Jin

Background shape due to fake electrons
   Sasha Lebedev
Background shape due to open HF electrons
   Sasha
Forming mixed background
   Sasha

Yield extraction and precision estimates
   Tony

Configurations

Configurations before TPC simulation is available

Start with 7 layer MAPS tracker (close to perfect tracker)
Drop IB to 2 layers
Drop IB to 1 layer
Drop outer layers to two, with 3 layer IB

Reused pixel IB + silicon strips

Configurations after TPC simulation is available

Start with TPC + 3 layer IB + intermediate layer
Drop intermediate layer
Drop IB to 2 layers
Drop IB to 1 layer

Reused pixel IB + TPC

Repeat all for 2x2 ganged EMCal towers